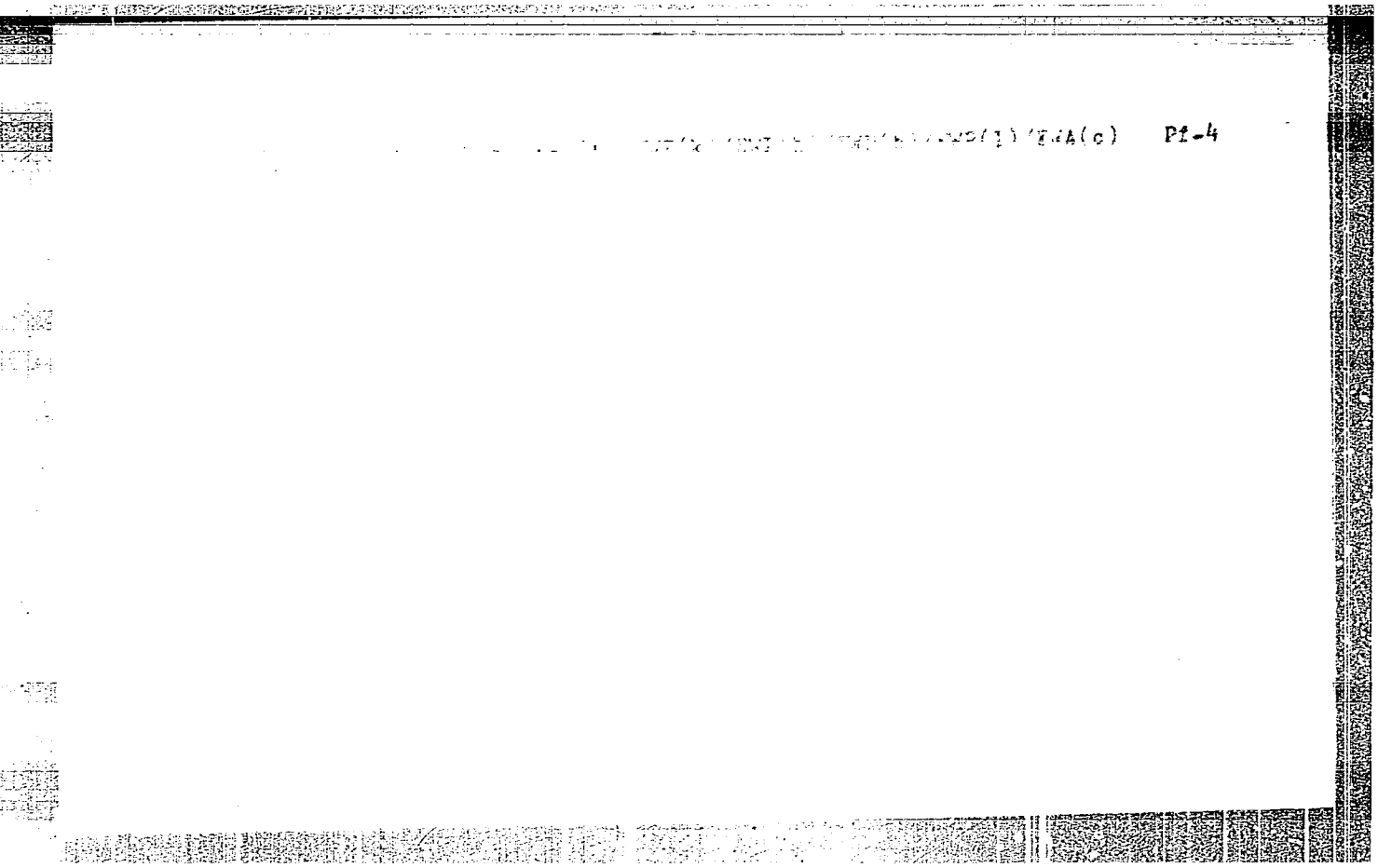
SUBA, Josef; JERHOT, Jaroslav, inz.

Action plans and railroad administration agencies. Zel dop tech 11 no.8:221-223 '63.

SUBA, Miroslav, inz.

Label extrusion on filter mounts by the hobbing process. Jemna mech opt 9 no. 9:287-288 S '64.

1. Meopta National Enterprise, Prerov.



SUBACH, A. [Subacs, A.]

Interaction of a strongly nonlinear torsional vibration system with the source of energy. Vestis Latv ak ...4:33-40 '62.

1. Institut avtomatiki i mekhaniki AN Latviyskoy SSR.

S/681/62/000/009/004/006
E031/E413

AUTHOR: Subach, A.P.

TITLE: An experimental investigation of the effect of structural damping on the region of instability of oscillatory systems having motors which are limited in power

SOURCE: Akademiya nauk Latviyskoy SSR. Institut avtomatiki i mekhaniki. Voprosy dinamiki i prochnosti. no.9. 1962. 53-62

TEXT: This paper is a continuation of previous work (A.P.Subach Sb. "Voirosy dinamiki i prochnosti", no.8. Izd-vo AN Latv.SSR, 1962). The main feature of the experimental equipment is a 100 watt electric motor attached to one end of a cantilever T-beam so that oscillations were produced in the horizontal plane. The beam was fixed to a solid base. The length from the supports to the centre of the shaft of the motor was 90 cm. The method of providing structural damping, together with relevant measurements, is given. The main object was to obtain resonance curves of stationary oscillations for various compressive forces on the beam and varying steepness of the motor characteristics. Data were obtained

Card 1/2

SUBACH, A.P.

Nonscaling coating of electrodes for welding steels and alloys containing elements with a strong affinity to oxygen. Trudy LPI no.245:51-58 '65. (MIRA 18:8)

IVANOVSKIS, Voldemars; MITRIS, Pavels; SUBACS, Arnolds; RUDZITIS, Raimonds; RASMANIS, Otto; VULFSONE, E., red.; AIZUPIETE, M., tekhn. red.

[Welder's handbook] Metinataja rokasgramata. [By] V.Ivanovskis un citi. Riga, Latvijas Valsts izdevnieciba. Vol.2. 1963. 270 p. (MIRA 16:4)

(Welding)

LERNER, I.O., kand. med. nauk.; SUBACH, L.A.

Necrosis of the fingers following intra-arterial blood transfusion. Akush. i gin. 34 no.6:102 N-D '58. (MIRA 12:1)

1.Iz 2-y gorodskoy bol'nitsy (glavnyy vrach L.Kh. Pinskiy) i 1-go rodil'nogo doma (glavnyy vrach G.F. Garanina) Kishinev.
(BLOOD--TRANSFUSION) (FINGERS--DISEASES)

SUBACH, V.

In close cooperation with industry. Prom.koop.no.2:31 F '56.
(MLRA 9:7)

1.Nachal'nik konstruktorsko-tekhnologicheskogo byuro Sverdlovskogo oblpromsoveta.
(Sverdlovsk--Industries)

SUBACH, YE. I.

SUBACH, YE. I. - inzh. i, MYSHLYAYEVA, V. V. - Kand. tekhn. nauk., ROYAK, S. M. - Kand. tekhn. nauk.

Vsesoyuznyy nauchno-issledovatel'skiy institut tsementnoy promyshlennosti (NIITSement)

ULUCHSHENIYE KACHESTVA MAGNEZIAL'NOGO SILIKATTSEMENTA Page 107

SO: Collection of Annotations of Scientific Research Work on Construction, completed in 1950, Moscow, 1951

SUBAChYuS, A. i. Cand Bio Chem —(diss) "Biological Properties of Varieties of the Yellow and the Narrow-leaf Lupines Cultivated in the Latvian SSR," Vil'yus, 1960, 31 pp, 250 copies (Vil'nyus State U im V. Kapsukas) (KL, 47/60, 100)

SUBAI, Jozsef (Budapest,II.,Bimbo u.11)

70,000+4,800 km by Danuvia. Auto moter 16 no.21:19 6 N '63.

VODOPIJA, Ivan, dr.; BARIC, Ljubo, dr.; SUBAJKOVIC, Mirajana, dr.; TOMPAK, Biserka, dr.; ALERAJ, Dora, dr.; KOSUTIC, Zvonimir, dr.; BREITENFELD, Vladimir, dr.

Salmonellosis java epidemia in a Zagreb hospital. Lijecn. vjesn. 84 no.4:331-338 '62.

1. Iz Zavoda za zastitu zdravlja grada Zagreba, Internog odjela Opce bolnice "Dra M. Stojanovica", Zavoda za zastitu zdravlja NR Hrvatske i Bolnice za zarazne bolesti u Zagrebu.

(SALMONELLA INFECTIONS epidemiol)

SUBANEVSKY, L., inz.

Thickness of 12-meter panels from porous concrete.
Stavivo 41 no.3:107 Mr '63.

SUBANOVIC, B.

TECHNOLOGY

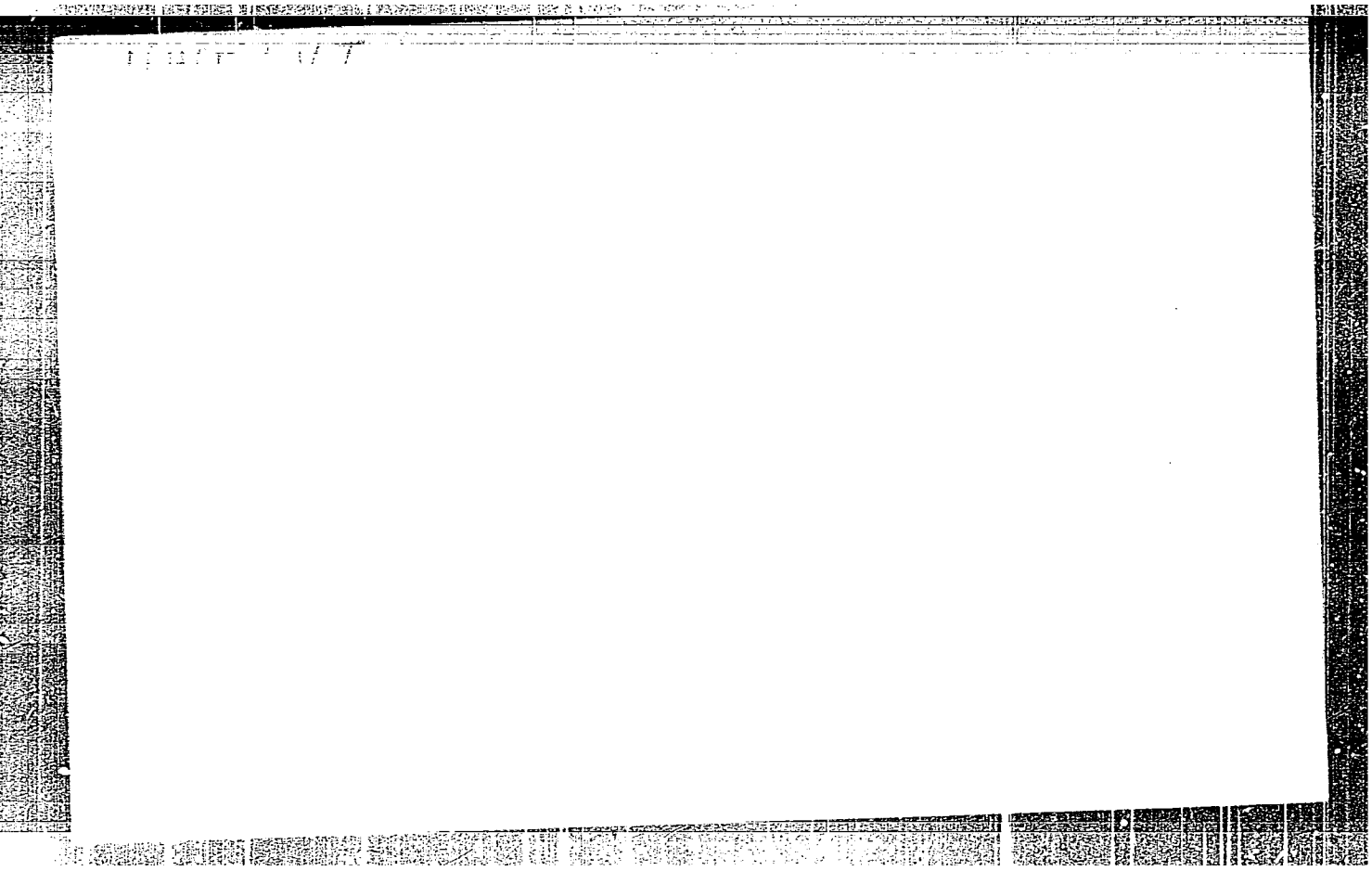
Periodical: ELEKTROPRIVREDA. Vol. 11, no. 9/10, Sept./Oct. 1958.

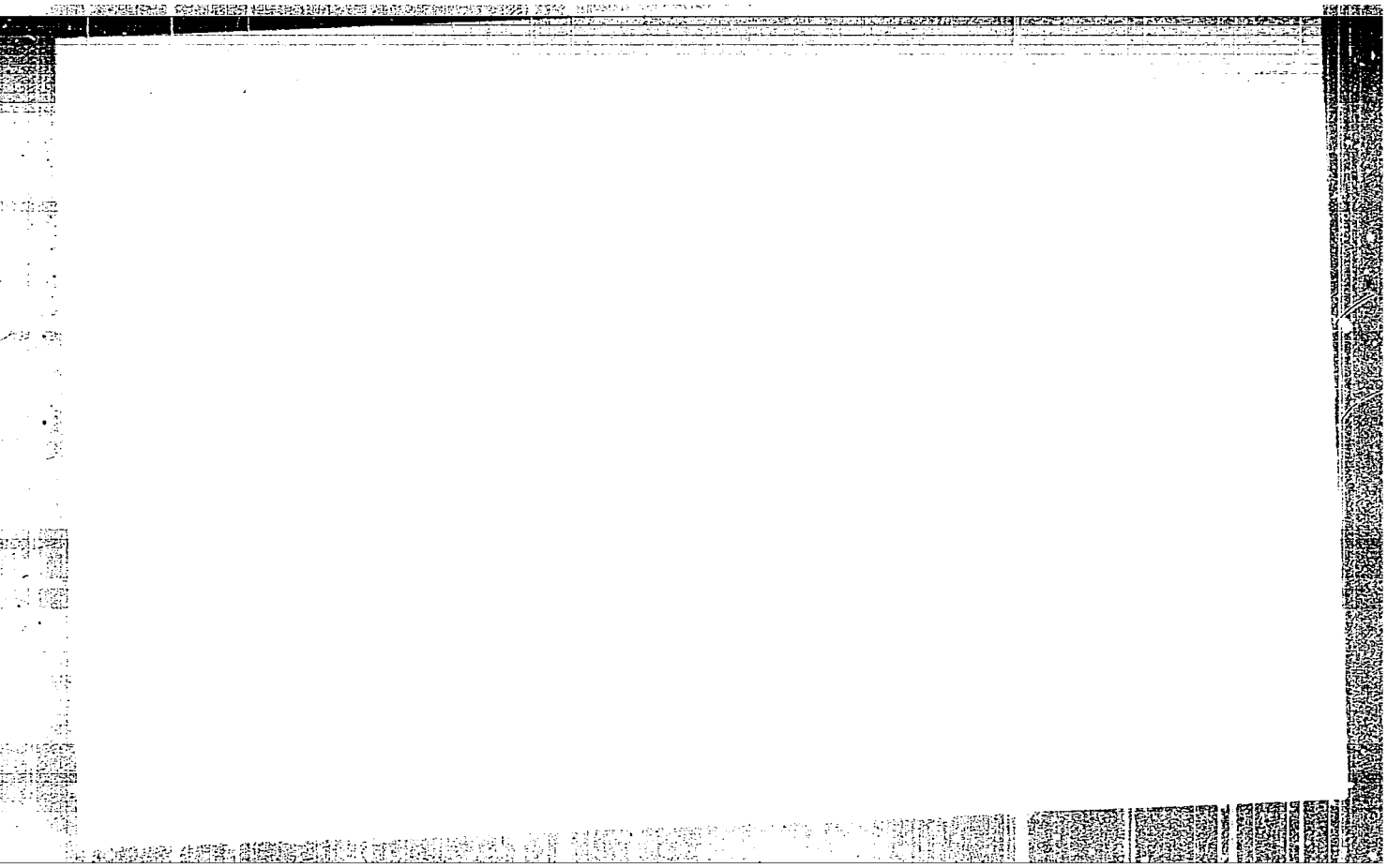
SUBANOVIC, B. Hydroelectric problems in the Crni Drim Valley. p. 414.

Monthly List of East European Accessions (EEAI) LC, Vol. 8, no. 3
March 1959 Unclass.

SUBANOVIC, Bratislav, prof. inz.

Flow control by catchment basins in a line. Elektroprivreda 16 no.2:79-83 Fe '63.





APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653710016-1"

SUBART, F.

Determining the most favorable pressures for k-stage compression associated with intake temperatures differing in single compression stages. p. 372.

APLIKACE MATEMATIKY. (Ceskoslovenska akademie ved. Matematicky ustav) Praha, Czechoslovakia Vol. 3, no. 5, 1958.

Monthly list of East European Accessions (EEAI), LC, Vol. 8, no. 12, December 1959 uncla.

SUBART, F.

"Analysis of the drying process." p. 220.

STROJIRENSTVI. (Ministerstvo tezkeho strojirenstvi, Ministerstvo presneho strojirenstvi a Ministerstvo automobiloveho prumyslu a zemedelskych stroju). Praha, Czechoslovakia, Vol. 9, No. 3, Mar. 1959.

Monthly list of East European Accessions (EEAI), LC, Vol. 8, No. 8, August 1959.
Uncla.

SUBART, Frantisek (Tyrsova 37, Brno)

Solution of the most favorable distribution of compression for multistage piston compressors. Acta tech. Cz 6 no.1:80-91 '61. (EEAI 10:6)

(Pistons)

ŠUBART, František, inz., C.Sc.

New information on the transition area of flowing. Stroj cas 12 no.6:321-329 '61.

1. Vojenska akademie A.Zapotockeho, Brno.

[redacted]

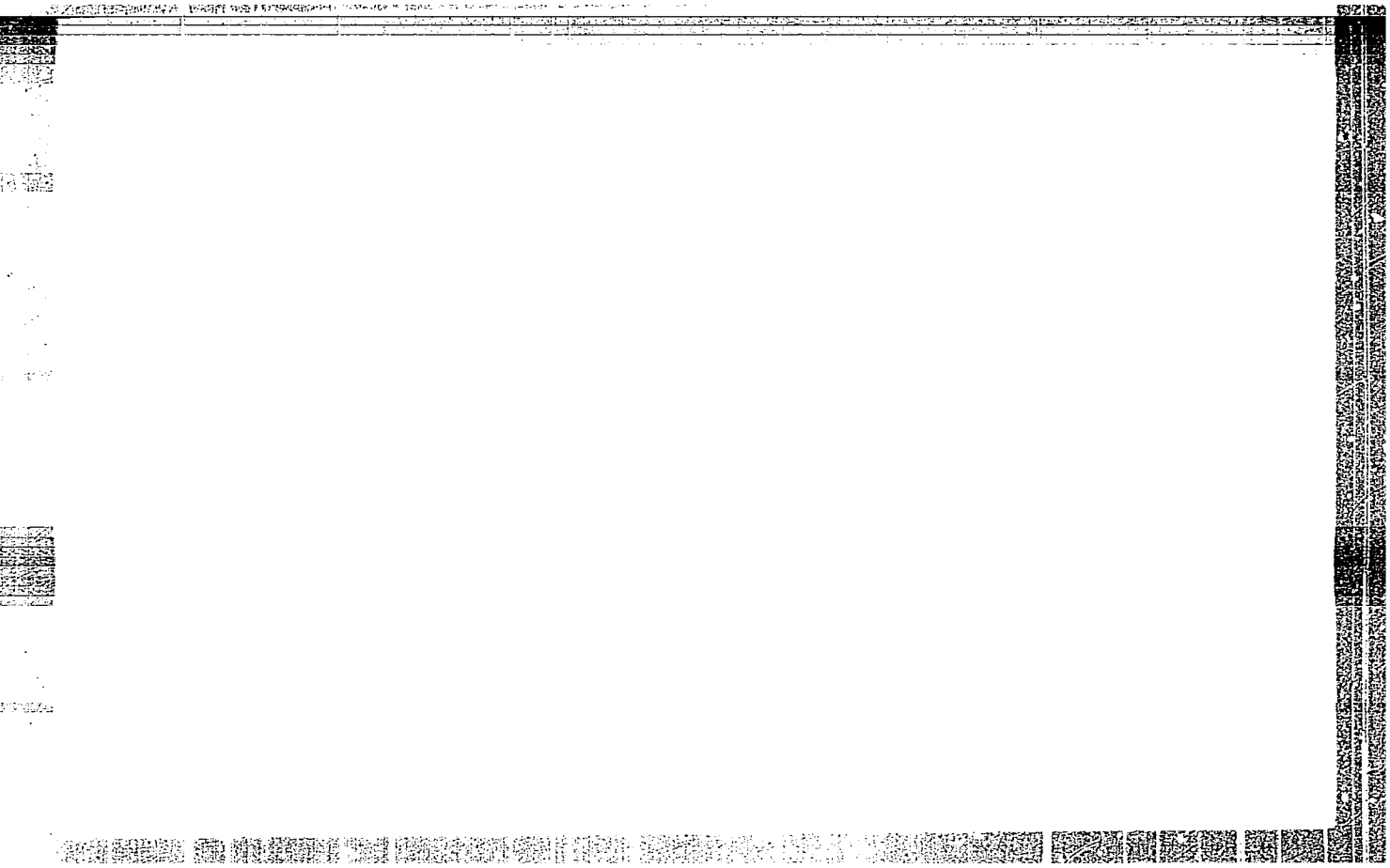
TITLE: Hot-electron Faraday effect

[redacted]

For a simplified case when the effective electron mass is isotropic,

[redacted]

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653710016-1"



APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653710016-1"

SUBASHIYEV, A.V.

Faraday effect on "hot" electrons. Fiz. tver. tela 7 no.3:936-938 Mr '65. (MIRA 18:4)

1. Fiziko-tekhnicheskiy institut imeni Ioffe, Leningrad.

L 58994-65 EWT(l)/EWT(m)/T/EWP(t)/EWP(b)/EWA(h) Pz-6/Pab IJP(c) AT/JD

ACCESSION NR: AP5017309 UR/0181/65/007/007/2129/2132

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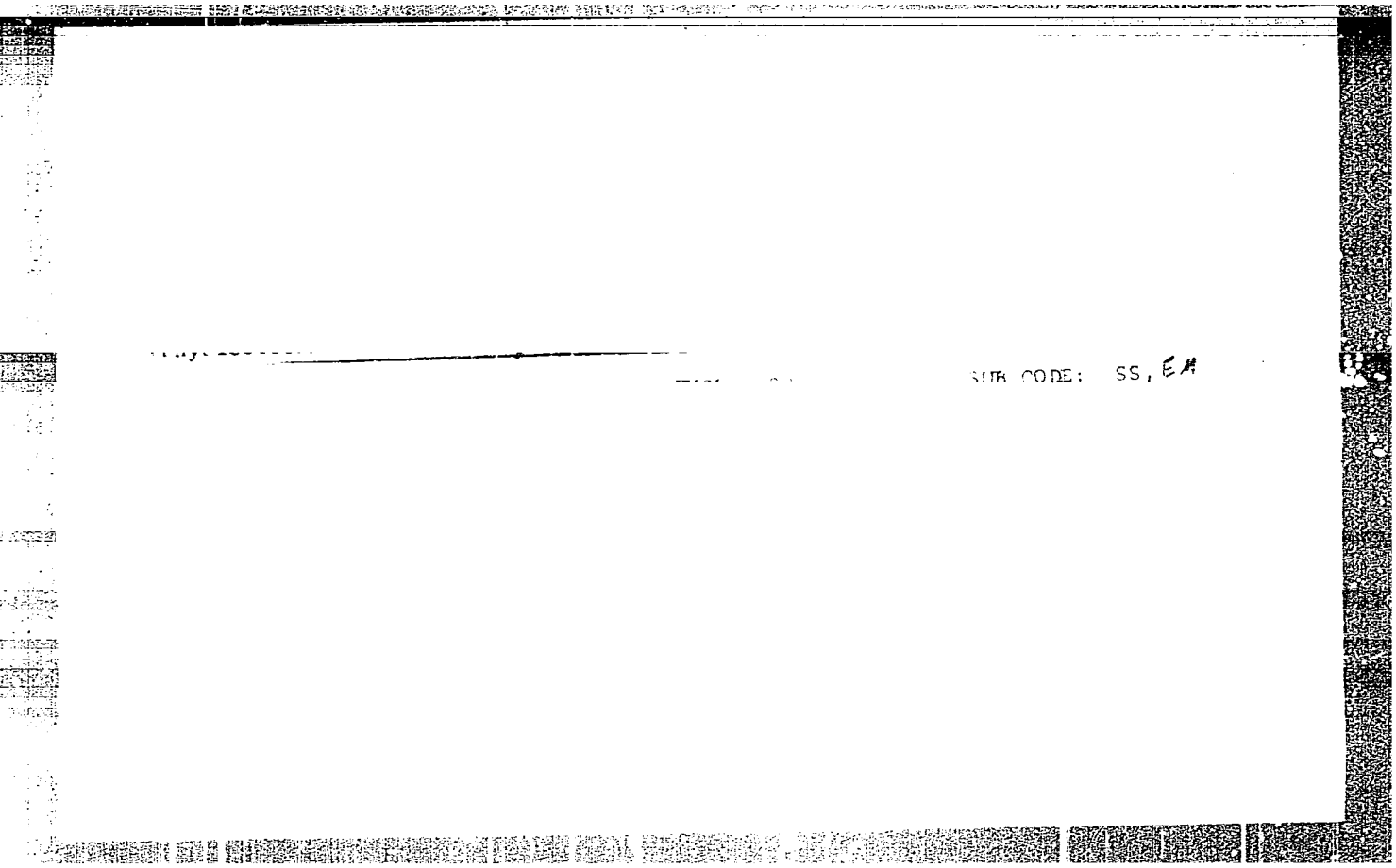
41
B

AUTHOR: Ipatova, I. P.; Kazarinov, R. F.; Subashiyev, A. V.

TITLE: The Faraday effect with respect to "hot" electrons in germanium and silicon

21 27 27



SUBASHIYEV, V. K. PA 11T23

USSR/Frequency Measurements
Impedance - Measurements Feb 1947

"Interpretation of Homogeneous Resistance Measurements for Various Frequencies," V. K. Subashiyev, V. M. Tuchkevich, 18 pp

"Zhur Tekh Fiz" Vol XVII, No 2

Theoretical determination of the complex impedance, Z. Graphs and tables relating R, C, Z, H and f.

11T23

SUBASHIYEV, V.K., kand.fiz.-mat.nauk; IOFFE, A.F., akademik, glavnyy red.; SOMINSKIY, M.S., kand.fiz.-mat.nauk, zav.glavnogo red.; SHALYT, S.S., doktor fiz.-mat.nauk, red.; REGEL', A.R., kand. fiz.-mat.nauk, red.; SHAGURIN, K.A., inzh., red.; ACHKINADZE, Sh.D., inzh., red.; FREGER, D.P., tekhn.red.

[Semiconductor converters of solar energy] Poluprovodnikovye preobrazovateli solnechnoi energii. Leningrad, 1956. 58 p. (Leningradskii dom nauchno-tekhnicheskoi propagandy. Poluprovodniki i ikh tekhnicheskoe primenenie, no.9). (MIRA 14:4)

(Solar batteries)

SUBASHIYEV, V K.

CARD 1 / 2 PA - 1566

SUBJECT USSR / PHYSICS
AUTHOR MASLAKOVEC,JU.P., POLTINNIKOV,S.A., DUBROVSKIJ,G.B., SUBAŠIEV,V.K.
TITLE P-Silicon Photoelectric Transformers of Solar Energy.
PERIODICAL Žurn.techn.fis,26, fasc.10, 2396-2397 (1956)
Issued: 11 / 1956

American authors produced photoelements from n-Si-monocrystals by bringing about p-n transitions in these crystals by means of diffusion from the gaseous phase of boron. In a similar manner the authors also attempted to produce the photoelement on the basis of p-silicon. This is of practical importance, because p-Si is less expensive and more easily obtainable than electron silicon. Sb served as an admixture, and diffusion was from the gaseous phase.
Foils of monocrystalline and polycrystalline p-silicon with a thickness of ~ 1 mm were used for production. After fixing the contacts, the voltampère characteristics for brightness and darkness were recorded. One of the photoelements consisted of a foil of 1 cm^2 area and was produced from monocrystalline p-silicon with ϱ = 5 ohm cm and τ = 4 microsec. Its voltampère characteristic had well marked saturation domains in the reverse direction. These parts of the voltampère characteristics for brightness which correspond to load were nearly rectangular in shape. The spectral characteristic of this photoelement has its maximum at 700 mμ. The red boundary of sensitivity agrees well with the width of the forbidden zone in the Si.

Furthermore, the load characteristic on the occasion of a solar radiation of 910 watts/cm^2 was recorded and the useful coefficients for different load resistances (and consequently also for various load voltages) were computed. The maximum useful coefficient under conditions such as prevailed on this occasion was 2,8%.
On the occasion of the measuring of the useful coefficient the total incoming energy was always measured by means of a perioheliometer. The electrodes used did not afford a sufficiently low contact voltage, and therefore higher useful coefficients may be expected to be attained as a result of an improvement of contacts. The samples, which were produced from low-resistance polycrystalline silicon (several large crystals on a plate) gave less favorable results compared with those obtained by the samples described above. Their maximum useful coefficient remained below 0,6%.
It would be of great practical interest to discover a possibility of producing transformers with a useful coefficient of from ~ 1 to 2% of comparatively impure silicon (with ϱ < 1 ohm cm).

OSTROUMOV, Andrey Georgiyevich, inzh.; IOFFE, A.F., akademik, red.; SOMINSKIY, M.S., kand.fiz.-mat.nauk, red.; MASLAKOVETS, Yu.P., doktor fiz.-mat.nauk, red.; SMOLENSKIY, G.A., doktor fiz.-mat. nauk, red.; SHALYT, S.S., doktor fiz.-mat.nauk, red.; REGEL', A.R., kand.fiz.-mat.nauk, red.; SUBASHIYEV, V.K., kand.fiz.-mat.nauk, red.; SHAGURIN, K.A., inzh.; ACHKINADZE, Sh.D., inzh., red.; FREGER, D.P., tekhn.red.

[Piezoelectric substances] P'ezoelektriki. Leningrad, Leningr. dom nauchno-tekhn.propagandy, 1957. 30 p. (Poluprovodniki, no.16) (MIRA 10:12)

(Piezoelectric substances)

PASYNKOV, Vladimir Vasil'yevich, doktor tekhn.nauk; IOFFE, A.F., akademik, glavnyy red.; SOMINSKIY, kand.fiz.-mat.nauk, red.; MASLAKOVETS, Yu.P., doktor fiz.-mat.nauk, red.; SMOLENSKIY, G.A., doktor fiz.-mat.nauk, red.; SHALYT, S.S., doktor fiz.-mat.nauk, red.; REGEL', A.R., kand. fiz.-mat.nauk, red.; SUBASHIYEV, V.K., kand.fiz.-mat.nauk, red.; SHAGURIN, K.A., inzh.; ACHKINADZE, Sh.D., inzh.; FREGER, D.P., tekhn.red.

[Nonlinear semiconductor resistors; varistors] Nelineinye poluprovodnikovye soprotivleniia; varistory. Leningrad, Leningr. dom nauchno-tekhn.propagandy, 1957. 35 p. (Poluprovodniki, no.5) (MIRA 11:1)
(Electric resistors)

SUBASHIYEV, V.K.

MIRLIN, David Naumovich; IOFFE, A.F., akademik, red.; SOMINSKIY, M.S., kand.fiz.-mat.nauk, red.; MASLAKOVETS, Yu.P., doktor fiz.-mat. nauk, red.; SMOLENSKIY, G.A., doktor fiz.-mat.nauk, red.; SHALYT, S.S., doktor fiz.-mat.nauk, red.; REGEL, A.R., kand.fiz.-mat. nauk, red.; SUBASHIYEV, V.K., kand.fiz.-mat.nauk, red.; SHAGURIN, K.A., inzh., red.; ACHKINADZE, Sh.D., inzh., red.; FREGER, D.P., tekhn.red.

[Semiconductor bolometers] Poluprovodnikovye bolometry. Leningrad, Leningr.dom nauchno-tekhn.propagandy. 1957. 36 p. (Poluprovodniki, no.4) (MIRA 10:12)

(Bolometer)

SMOLENSKIY, Georgiy Anatol'yevich, doktor fiz.-mat.nauk; ISUPOV, Vladislav Aleksandrovich, inzh.; IOFFE, A.F., akademik red.; SOMINSKIY, M.S., kand.fiz-mat.nauk, red.; MASLAKOVETS, Yu.P., doktor fiz.-mat.nauk; SHALYK, S.S., doktor, fiz-mat.nauk; REGEL', A.R., kand.fiz.-mat. nauk; SUBSHIYEV, V.K., kand.fiz-mat.nauk; SHAGURIN, K.A., inzh.; ACHKINADZE, Sh.D., inzh., red.; FREGER, D.P., tekhn.red.

[Seignettoelectric substances] Segnetoelektriki. Leningrad, Leningr.dom nauchno-tekhn.propagandy, 1957. 43 p. (Poluprovodniki, no.15) (MIRA 10:12)

(Ferroelectric substances)

VORONIN, Anatoliy Nikolayevich, inzh.; IOFFE, A.F., akademik, red.; SOMINSKIY, M.S., kand. fiz.-mat. nauk, red.; MASLAKOVETS, Yu.P., doktor fiz.-mat.nauk, red.; SMOLENSKIY, G.A., doktor fiz.-mat.nauk, red.; SHALYT, S.S., doktor fiz.-mat.nauk, red.; REGEL', A.R., kand. fiz.-mat.nauk; SUBASHIYEV, V.K., kand.fiz.-mat.nauk, red.; SHAGURIN, K.A., inzh.red.; ACHKINADZE, Sh.D., inzh.; FREGER, D.P., tekhn.red.

[Semiconductor thermoelectric generators] Poluprovodnikovye termoelektrogeneratory. Leningrad, Leningr. dom nauchno-tekhn.propagandy, 1957. 43 p. (Poluprovodniki, no.13) (MIRA 11:3)
(Semiconductors) (Electric generators)

SUBASHIYEV, Vagan Kasparovich, kand. fiz.-mat. nauk.; IOFFE, A.F., glavnyy red.; SOMINSKIY, M.S., kand. fiz.-mat. nauk, red.; MASLAKOVETS, Yu. P., doktor fiz.-mat. nauk, red.; SMOLENSKIY, G.A., doktor fiz.-mat. nauk, red.; SHALYT, S.S., doktor fiz.-mat. nauk, red.; REGEL', A.R. kand. fiz.-mat. nauk,red.; SHAGYRIN, K.A., inzh., red.; ACHKINADZE, Sh. D., inzh., red.

[Transistor diotes and triodes; point-contact diodes and triodes] Poluprovodnikovye diody i triody; tochechnye diody i triody. Leningrad, Leningr. dom nauchno-tekhn.propagandy, 1957. 52 p. (MIRA 11:11) (Poluprovodniki, no. 7).

(Transistors)

SOMINSKIY, Momus Samuilovich, kand. fiz.-mat. nauk; IOFFE, A.F., akademik, glavnyy red.; MASLAKOVETS, Yu.P., doktor fiz.-mat. nauk, red.; SMOLENSKIY, G.A., doktor fiz.-mat. nauk, red.; SHALYT, S.S., doktor fiz.-mat. nauk, red.; REGEL', A.P., kand. fiz.-mat. nauk, red.; SUBASHIYEV, V.K., kand. fiz.-mat. nauk, red.; SHAGURIN, K.A., inzh., red.; ACHKINADZE, Sh.D. inzh., red.; FREGER, D.P., tekhn. red.

[Photoresistors] Fotosoprotivleniia. Leningrad, Leningr. dom nauchno-tekhn. propagandy, 1957. 54 p. (Poluprovodniki, no.6). (MIRA 11:9)
(Photoelectric cells)

9(4) 24(3) 26(3D) PHASE I BOOK EXPLOITATION SOV/1481

Subashiyev, Vagan Kasparovich, Candidate of Physical and Mathematical Sciences

Fotoelektricheskiye preobrazovateli solnechnoy energii (Photoelectric Converters of Solar Energy) Leningrad, Leningr. dom nauchno-tekhn. propagandy, 1957. 61 p. (Series: Poluprovodniki, vyp. 9) 15,000 copies printed.

Sponsoring Agencies: Obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy RSFSR, Leningradskiy dom nauchno-tekhnicheskoy propagandy, and Akademiya nauk SSSR. Institut poluprovodnikov

Tech. Ed.: D.P. Freger; Editorial Board: A.F. Ioffe (Chief Ed.) Academician, M.S. Sominskiy (Deputy Chief Ed.) Candidate of Physical and Mathematical Sciences, Yu.P. Maslakovets, Doctor of Physical and Mathematical Sciences, G.A. Smolenskiy, Doctor of Physical and Mathematical Sciences, S.S. Shalyt, Doctor of Physical and Mathematical Sciences, A.R. Regel', Candidate of Physical and Mathematical Sciences, V.K. Subashiyev, Candidate of Physical and Mathematical Sciences, K.A. Shagurin, Engineer, Sh.D. Achkinadze, Engineer.

Card 1/4

Photoelectric Converters (Cont.) SOV/1481

PURPOSE: This booklet is addressed to engineers and technicians in the field of semiconductor electronics.

COVERAGE: This booklet is the 9th of the series on semiconductors. A list of 18 titles constituting the series is given at the end of each booklet. (For a translation of these titles see Phase I Book Exploitation, No. 674.) The author briefly mentions the early applications of solar energy and then describes its various contemporary uses. These include conversion of solar energy into heat and mechanical energy, photosynthesis, and the use of solar energy for obtaining electricity. The author enumerates the three methods of such conversion: a) thermoelectric, b) photogalvanic, and c) photoelectric. The present booklet describes photoelectric conversion. No personalities are mentioned. There are 43 references, of which 24 are Soviet (including 3 translations), 18 English, and 1 German.

TABLE OF CONTENTS:

Card 2/4

AVAILABLE: Library of Congress

JP/sfm
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SUBASHIYEV, V.K.

ZHUZE, Vladimir Panteleymonovich; IOFFE, A.F., akademik, glavnyy red.; SOMINSKIY, M.S., kand.fiz.-mat.-nauk, red.; MASLAKOVETS, Yu.P., doktor fiz.-mat.nauk, red.; SMOLENSKIY, G.A., doktor fiz.-mat. nauk, red.; SHALYT', S.S., doktor fiz.-mat.nauk, red.; HEGEL', A.R., kand.fiz.-mat.nauk, red.; SUBASHIYEV, V.K., kand.fiz.-mat.nauk, red.; SHAGURIN, K.A., inzh., red.; ACHKINADZE, Sh.D., inzh., red.; FREGER, D.P., tekhn.red.

[Semiconducting materials (semiconductor elements)] Poluprovodnikovye materialy (elementy - poluprovodniki). Leningrad, 1957. 101 p. (Obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii RSFSR, no.17) (MIRA 12:4)

(Semiconductors)

SUBASHIYEV, Vagan Kasparovich, kand. fiz.-mat. nauk,; FREGER, D.P., tekhn. red.

[Transistor diodes and triodes; junction-type diodes and triodes] Poluprovodnikovye diody i triody; ploskostnye diody i triody. Leningrad, Leningr. dom nauchno-tekhn. propagandy, 1957. 117 p. (MIRA 11:11)
(Poluprovodniki, no. 7a)
(Transistors)

SUBASHIYEV, V.K.

29(2) PHASE I BOOK EXPLOITATION SOV/2594

Akademiya nauk SSSR

Iskusstvennyye sputniki zemli. vyp. 2: Rezul'taty nauchnykh issledovaniy, poluchennyye pri pomoshchi tret'yego iskusstvennogo sputnika zemli (Artificial Earth Satellites. No 2: Results of Scientific Studies Obtained by the Third Earth Satellite) Moscow, Izd-vo AN SSSR, 1958. 82 p. 3,500 copies printed.

Ed.: L. V. Kurnosova; Ed. of Publishing House: D. M. Alekseyev; Tech. Ed.: Yu. V. Rylina.

PURPOSE: This work is intended for geophysicists, meteorologists, and other scientific and technical personnel engaged in space exploration and research.

COVERAGE: This collection of articles contains certain of the scientific findings recorded by the third Soviet space satellite. Much corroborating data from other rocket and satellite investigations are included. The articles are based on papers originally read at the Fifth Assembly of the

Card 1/4

of the Special IGY Committee held in Moscow in August, 1958. Individual articles discuss the ionic composition and density of the atmosphere, the thermodynamic parameters of the stratosphere, and questions dealing with the motion of the satellite. References accompany each article.

Krasovskiy, V.I. Soviet Research of the Ionosphere by Means of Rockets and Artificial Earth Satellites	36
Dolginov, S.Sh., L.N. Zhuzgov, and N.V. Pushkov. Preliminary Report on Geomagnetic Measurements on the Third Soviet Artificial Earth Satellite	50
Komissarov, O.D., T.N. Nazarov, L.N. Neugodov, S.M. Poloskov, and L.Z. Rusakova. Studies of Micrometeorites by Rockets and Satellites	54
Krasovskiy, V.I., Yu.M. Kushnir, G.A. Bordovskiy, G.F. Zakharov, and Ye.M. Svetlitskiy. Detection of Corpuscles by the Third Artificial Earth Satellite	59
Vernov, S.N., P.V. Vakulov, Ye.V. Gorchakov, Yu.I. Logachev, and A.Ye. Chudakov. Study of the Soft Component of Cosmic Rays Beyond Atmospheric Limits	61
Kurnosova, L.V., L.A. Razorenov, and M.I. Fradkin. Heavy Nuclei in Primary Cosmic Radiation	70

Artificial Earth Satellites (Cont.) SOV/2594

Vavilov, V.S., A.P. Landsman, and V.K. Subashiyev. Solar Batteries	75
Isakovich, M.A. and N. A. Roy. Acoustical Method of Measuring the Mechanical Parameters of Meteorites	81

AVAILABLE: Library of Congress

MM/mal
12-18/59

Card 4/4

The authors survey achievements made in the investigation and application of the photoelectric effect and refer to developments by the following Soviet scientists: photoelectric multipliers by L.A. Kubetskiy, P.V. Timofeyev, S.A. Vekshinskiy and N.S. Khlebnikov; photon counters by S.F. Rodionov; antimony-cesium photocells by P.I. Lukirskiy, N.S. Khlebnikov and P.V. Timofeyev; thallium-sulfate photocells by Yu.P. Maslakovets and B.T. Kolomiyets; silver-sulfate photocells by V.K, Bernatskiy and D.S. Geykhman; and germanium photodiodes by S.M. Ryvkin and V.M. Tuchkevich. The article explains the theory f the photoelectric effect as based on quantum physics and describes various types of photocells in the order of their development. At the end of the authors describe photocells developed in East Germany, the USSR, and the USA. There are 49 references, of which 28 are Soviet, 16 English, 3 German, and 2 French.

AUTHOR: Subashiyev, V. K.

TITLE: A Circuit for Rapid Measurement of the Volt-Amp Characteristic of a Valve Photocell (Skhema dlya bystrogo snyatiya vol'tampernykh kharakteristik ventil'nogo fotoelementa)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1958, Nr 1, pp 125-126 (USSR)

ABSTRACT: The circuit can be used to obtain quickly an oscillogram of a photocell characteristic and then using pointer instruments to obtain more accurately any part of the characteristic. The circuit is shown in Fig.1 and consists of two parts: oscillographic part (on the left) and instrumental (on the right). The oscillographic part consists of a step down transformer Tp1 , an autotransformer Tp2 , a resistance box M(KMS-6) , a key K_1 , an oscillograph, and a relay which gives the axes simultaneously with the volt-amp characteristic on the screen of the oscillograph. The horizontal deflection of the beam is proportional to the instantaneous voltage across the photocell and the vertical deflection is proportional to the current through the photocell. Figs.3 and 4 show oscillograms of volt-amp characteristics of a photocell with and without illumination. The instrumental part of the circuit consists of suitable

Card 1/2

A Circuit for Rapid Measurement of the Volt-Amp Characteristic of a Valve Photocell.

pointer instruments and DC power supplies which can be used to obtain the static characteristic in the neighbourhood of any given point chosen on the oscillogram. There are 4 figures, no references.

ASSOCIATION: Institut poluprovodnikov AN SSSR (Institute for Semi-Conductors, Academy of Sciences of the USSR)

SUBMITTED: July 19, 1957.

1. Photoelectric cells--Electrical properties 2. Photoelectric cells --Testing equipment 3. Electrical equipment--Circuits

VAVILOV, V.S.; LANDSMAN, A.P.; SUBASHIYEV, V.K.

Solar batteries. Isk.sput.Zem. no.2:75-80 '58. (MIRA 12:5)

(Artificial satellites)
(Solar batteries)

BOROVIKOVA, R.P. [translator]; DUBROVSKIY, G.B.[translator]; OKHOTIN, A.S. [translator]; PEDYASH, E.M. [translator]; MASLAKOVETS, Yu.P., prof., doktor fiz.-mat.nauk, red.; SUBASHIYEV, V.K., kand.fiz.-mat.nauk, red.; VISKOVA, M.V., red.; SMIRNOVA, N.I., tekhn.red.

[Semiconductor transformers of radiant energy] Poluprovodnikovye preobrazovateli energii izluchenii; sbornik statei. Moskva, Izd-vo inostr.lit-ry, 1959. 407 p. (MIRA 12:4)
(Semiconductors) (Photoelectricity)

82468
S/112/60/000/006/021/032

9,4340

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1960, No. 6, p. 370, # 5.2842

AUTHORS: Subashiyev, V. K., Sinitsa, S. P.

TITLE: Potential Distribution Along a Thread-Shaped Germanium Diode at Mean Injection Levels

PERIODICAL: Nauchno-tekhn. inform. byul. Leningr. politekhn. in-t, 1959, No. 1, pp. 31-40

TEXT: The potential distribution along thread-shaped diodes at a current density of 0.05-10 amp/cm^2 has been studied. The diodes were made of n-type Ge with ρ = 15-20 ohm cm and L_p = 0.1 cm. The measurements were made by a probe method under pulse conditions in a balanced circuit. A strong conductivity modulation has been revealed for current densities of 0.1 amp/cm^2. The electric field distribution along the diode has been found. Near the p-n-junction the field is small and almost independent of the current density. In the base the field increases with increasing current density and can reach high values. It is shown that at mean injection levels the condition of neutrality in the base is not fulfilled. The density distribution of non-balanced current carriers

Card 1/2

SHATS, Solomon Yakovlevich; SUBASHIYEV, V.K., retsenzent; GOL'DSHTEYN, L.D., retsenzent; VLASOVA, Z.V., red.; KOROVENKO, Yu.N., tekhn. red.

[Transistors and principles of their operation] Tranzistory i osnovy ikh primeneniia. Leningrad, Sudpromgiz, 1960. 135 p. (MIRA 15:5)

(Transistors)

Distribution of Losses and Efficiencies of Various Processes in Photoelectric Transformations of Solar Energy

for two intensities of solar radiation: W = 135 mw/cm^2 and W = 83.4 mw/cm^2. Table 3 gives the data calculated for four hypothetical p-n junctions, whose dark current-voltage characteristic has the form $j = j_s[\exp(qV/AkT) - 1]$. For the first three A is assumed to be 1, for the fourth, A = 2 and $j_s = 2.10^{-8}$ a/cm^2. In conclusion, the author thanks Academician A. F. Ioffe for valuable advice, B. Ya. Moyzhes for discussions, and N. P. Alekseyeva for numerical computations. There are 1 figure, 3 tables, and 8 references: 3 Soviet and 5 American.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors of the AS USSR, Leningrad)

SUBMITTED: May 6, 1959

Card 2/2

S/181/60/002/02/04/033
B006/B067

Determination of the Recombination Constants From the Spectral Characteristics of a Photocell With p-n Junction

coefficient, d the thickness of the semiconductor layer in the photocell. If k and β are known, and $j_{sh.cir.}$ and r are measured, $\alpha(\lambda)$ can be experimentally determined. α can be theoretically determined from the structural and recombination constants of the photocell, i.e., the recombination constants can be determined vice versa from the experimentally known shape of $\alpha(\lambda)$. First, the analysis of the theoretical expression for α is discussed, i.e., for the case where the light hits the p-n junction plane perpendicularly. The analysis was made by using formulas of Bir and Pikus, which for the case of monochromatic irradiation, give the dependence of α on the depth l in which the p-n junction is found, on the surface recombination rate s, on the diffusion length of the holes L_p, on the diffusion length of the electrons L_n, and on k. The quantity α^* which differs from α only at small k, is also introduced for the analysis ($\alpha^* = ke^{-kl_L}$) because it allows a more simple representation. Fig. 1 shows α_n^* as a function of kL_n, Fig. 2 $\alpha_p^* = f(kL_p)$. α_n^* corresponds to the collection factor of the electrons passing through

Card 2/3

the p-n junction from the hole into the electron part - and α_p^* corresponds to the collection factor of the holes passing through the p-n junction from the electron into the hole region. The results are then applied to special cases: First, the region of strong absorption is investigated: k is large, λ small. The theoretical dependence of α^* on 1/k is investigated (Fig. 3), i.e., for the limiting cases 1) $kL_p \gg 1$, $kL_n \gg 1$, and $kl \gg 1$, and 2) kL_p and kL_n are large compared to 1; however, kl not so large, so that the terms containing e^{-kl} can be neglected. The case of weak absorption (k small, λ large) is investigated in similar manner. A large number of relations between the various quantities are given. There are 4 figures and 3 Soviet references.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors AS USSR, Leningrad)

SUBMITTED: May 6, 1959

Card 3/3

The Energy Diagram of the Real Silicon Photocell S/181/60/002/02/05/033
B006/B067

cases of silicon photocells which had been obtained by diffusion from Sb into p-type silicon. Fig. 2 shows the dependence of the electron concentration in silicon and of the position of the level of the chemical potential on the impurity (Sb) concentration; Fig. 3 shows the concentration distribution and the energy diagram of a p-type Si-element with a resistivity of 0.85 ohm.cm. Fig. 4 shows the same, however, for p-type silicon with 9.8 ohm.cm. It was found necessary to take account of field and voltage drop in the diffusion layer when analyzing the work of such a photocell. The possibility is indicated of producing photocells in such a way that they have optimum energy characteristics. There are 4 figures and 12 references: 4 Soviet, 7 American, and 1 British.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors of the AS USSR, Leningrad)

SUBMITTED: May 6, 1959

Card 2/2

81635
S/181/60/002/06/23/050
B006/B056

24.7600

AUTHORS: Subashiyev, V. K., Poltinnikov, S. A.

TITLE: Determination of the Mobility and Concentration of Carriers in the Surface Layer of a Semiconductor

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 6, pp. 1169-1177

TEXT: In the present paper, the authors suggest two methods of investigating the surface concentration and mobility of the carriers in the skin layer of a semiconductor with p-n junction produced by diffusion. Both methods are based upon measuring conductivity and the Hall effect; when using the former method, it is, however, necessary to know the connection between mobility and concentration of the carriers, and also the law of the depth distribution of impurity atoms. In the second method, the Hall effect and the conductivity before and after the removal of a very thin surface layer are determined; from the data of measurement the mean mobility in the removed layer $\bar{\mu}$ and the carrier concentration $\bar{n}$ are determined. Plates of p-type silicon single crystals into which antimony was diffused from the gaseous phase, were used for

Card 1/3

Determination of the Mobility and Concentration of Carriers in the Surface Layer of a Semiconductor

S/181/60/002/06/23/050
B006/B056

the experimental investigations. The mean resistivity was between 0.8 and 50 ohm.cm. According to the duration, temperature, and pressure of the antimony diffusion, an n-type layer with different parameters was obtained on the sample surface. The experimental arrangement for measuring the resistivity of the n-type layer is shown in Fig. 7, and the measuring technique is briefly described. For the purpose of measuring mobility, a transverse magnetic field was applied to the samples with a constant current passing through, and the Hall electromotive force U occurring was determined, viz., also by means of the experimental arrangement shown in Fig. 7. The results obtained by these measurements are given in Table 1 for six different samples under different diffusion conditions. This table gives the concentration $n(l) = p$, and further U/C, μ_o and n_o; (l is the thickness of the n-type layer, n - electron concentration, p - hole concentration in the initial p-type silicon, and μ - mobility). The results obtained by the second method briefly described in the following, which were obtained on the sample denoted in Table 1 with 206M1 (20bI1) are given in Table 2.

Card 2/3

SUBASHIYEV, V.K.

82547

S/181/60/002/007/027/042
B006/B060

24.7700

AUTHORS: Dubrovskiy, G. B., Subashiyev, V. K.

TITLE: Determination of the Recombination Constants by the Spectral Characteristics of Photocells With p-n Junction. III

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 7, pp. 1562-1571

TEXT: In the previous paper I (Ref. 1) the authors had made an analysis of the spectral characteristics (determinations of the short-circuit current per incident quantum, the absorption coefficient k of the material, the reflection coefficient r of the surface of the photocell) and the quantum yield of the internal photoeffect) of photocells with p-n junction, namely, for p-type silicon (with a hole concentration of $\approx 5 \cdot 10^{14} cm^{-3}$ at $300^{\circ}K$). The present paper makes use of the results obtained there for the determination of the recombination constants for a silicon photocell, obtained by diffusion of donor impurities into p-type silicon. The k and r values utilized for the purpose were determined in specific experiments. The method of measurement and the apparatus are first described briefly. Fig. 1 is a schematic reproduction of the circuit for the

Card 1/3

Determination of the Recombination Constants by the Spectral Characteristics of Photocells With p-n Junction. II

measurement of the quantum yield. The results obtained from the investigations are illustrated in diagrams: Fig. 1 shows $k(\lambda)$, Fig. 3 shows $r(\lambda)$ for three different photocells, Fig. 4 shows the short-circuit current as a function of λ, and Fig. 5 shows $\alpha(\lambda)$ (α denotes the separation coefficient). Figs. 6 and 7 likewise show $\alpha(\lambda)$ for other photocells. The recombination constants are calculated by strictly complying with Part I of the paper, where also the definitions for the quantities are given. The hole diffusion length L_p can be determined from the relation

$$\Delta = L_p \frac{s}{D_p} \operatorname{sh} \frac{l}{L_p} + \operatorname{ch} \frac{l}{L_p}$$

(where l denotes the depth of the p-n junction, which amounts to a few microns in most cases), and the electron diffusion length L_n in the p-type region can be determined from the longwave part of the characteristic. The following is obtained for a photocell designated with No. 3: $L_p = 2.2\ \mu$, $L_n = 0.2\ \mu$ (characteristics: Figs. 3, 6, 9), for a photocell of the type $\Phi 2(F2)$: $L_p = 10\ \mu$, $L_n = 8\ \mu$ (Figs. 3, 5, 8). The curves $\alpha^*/k = f(k)$ and $\alpha^* = f(1/k)$ are given for several photocells and

Card 2/3

82547

Determination of the Recombination Constants by the Spectral Characteristics of Photocells With p-n Junction, II

S/181/60/002/007/027/042
B006/B060

discussed. (α^* - experimental separation coefficient). All of the numerical results are tabulated in a table (p. 1569): l, L_p, L_n, and S/D_p for the types F2, Ф3 (F3), Ф4 (F4) as well as 11 laboratory-produced cells. The results are finally discussed and some error sources are examined. The authors thank G. Ye. Pikus and G. L. Bir for their discussions. A. V. Ditman is mentioned. A ЗМР-2 (ZMR-2) monochromator calibrated in absolute energy units with a standard thermocouple of the VNIIM, was used for measuring the quantum yield of the photocells. There are 10 figures, 1 table, and 7 references: 5 Soviet and 2 US.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad
(Institute of Semiconductors of the AS USSR, Leningrad)

SUBMITTED: July 9, 1959

Card 3/3

83021
S/181/60/002/008/040/045
B006/B063

24.7700

AUTHORS: Berman, L. S., Subashiyev, V. K.

TITLE: Study of the Barrier Capacity of Silicon p-n Junctions Obtained by Diffusion

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 8, pp. 1962 - 1965

TEXT: The authors studied the temperature and voltage dependence of the barrier capacity of silicon p-n junctions. Theoretically, the voltage dependence of the barrier capacity, C_b, is given by the relation $C_b = k/\sqrt[n]{V_k - V}$ (the concentration of the mobile carriers being neglected). Provided that the difference in the concentration of donors and acceptors, $N_d - N_a$, changes exponentially, $n = 2$, and, if there is a linear change, $n = 3$. The concentration of the mobile carriers can be taken into account by substituting another value (V^*) for the height of the potential barrier, V_k. For negative voltages, V^* is close to V_k and depends only slightly on the external voltage, V. The authors used the method of substitution to

Card 1/2

83021

Study of the Barrier Capacity of Silicon p-n Junctions Obtained by Diffusion

S/181/60/002/008/040/045
B006/B063

study four silicon photocells on an a-c bridge (frequency range 400 - 10,000 cycles). The barrier capacity was determined by the method of linear diagrams (Ref. 8). It was shown that the theoretical relation is satisfied with $2.7 \leq n \leq 3$. The results obtained for various samples are shown in Figs. 1 - 4. In addition to the confirmation of the formula, the authors found that the barrier capacity increased with a rise in temperature, and that the temperature dependence of the barrier capacity decreased with a rise in the blocking voltage. At low temperatures, the barrier capacity drops with rising frequency. The latter fact has not been clarified as yet. There are 4 figures and 11 references: 7 Soviet, 2 German, and 1 US.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors of the AS USSR, Leningrad)

SUBMITTED: February 1, 1960

Card 2/2

83023
S/181/60/002/008/042/045
B006/B063

24.7700

AUTHORS: Subashiyev, V. K., Dubrovskiy, G. B., Petrusevich, V. A.

TITLE: Determination of the Recombination Constants and the Depth of the Position of the p-n Junction From the Spectral Characteristics of Photocells

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 8, pp. 1978 - 1980

TEXT: The authors theoretically developed a method of determining various constants of a semiconductor with a p-n junction. For this purpose it is necessary to illuminate a p-n photocell with $l_p \gg l_n$, L_n, L_p from the side of the n-type layer with light of two wavelengths, λ_1 and λ_2. The absorption coefficients of the n-type layer are indicated by k_1 and k_2. The straight lines representing $j_{s.c.} = f(1/k)$ cut the axes at two different points each, from the positions of which it is possible to determine the constants. $j_{s.c.} = \frac{qN}{\Delta}\left(1 + \frac{s}{D_p}\,\frac{1}{k}\right)$; $a = -D_p/s$, $h = qN/\Delta$.

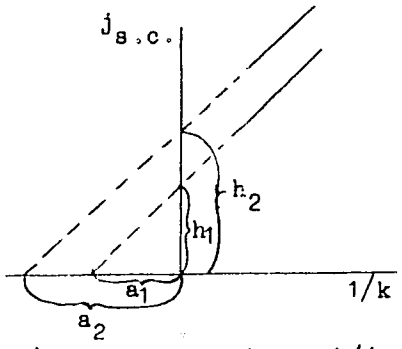
Card 1/3

83023

Determination of the Recombination Constants and the Depth of the Position of the p-n Junction From the Spectral Characteristics of Photocells

S/181/60/002/008/042/045
B006/B063

($j_{s.c.}$ - short-circuit current density, D_p - hole diffusion coefficient in the n-type region, q - electron charge, L_p - diffusion length of the minority carriers in the n-type region, l_n - thickness of the n-type region, L_n - diffusion length of the minority carriers in the p-type region, l_p - thickness of the p-type region, s - rate of surface recombination on the n-type surface, N - quantum flux density). Thus, for example, for $l_n/L_p \gg 1$:



$L_p = (h_1-h_2)/(h_2/a_2 - h_1/a_1)$, and for $l_n/L_p \ll 1$: $l_n = (h_1-h_2)/(h_2/a_2-h_1/a_1)$. If the ratio between the short-circuit current densities of the two wavelengths is denoted by α, the following relation is valid:

Card 2/3

Determination of the Recombination Constants and the Depth of the Position of the p-n Junction From the Spectral Characteristics of Photocells

S/181/60/002/008/042/045
B006/B063

$s/D_p = (\alpha - 1)k_1/(1 - \frac{k_1}{k_2}\alpha)$. The above relations for L_p and l_n may also be given for one wavelength, λ, if the sample has two different values for s. Here, α' denotes the ratio between the short-circuit current densities, and $w = (1 + \frac{s_2}{D_p}\frac{1}{k})/(1 + \frac{s_1}{D_p}\frac{1}{k})$.

$l_n/L_p \gg 1$: $L_p = (1 - \alpha' w)/(\alpha' w \frac{s_1}{D_p} - \frac{s_2}{D_p})$;

$l_n/L_p \ll 1$: $l_n = (1 - \alpha' w)/(\alpha' w \frac{s_1}{D_p} - \frac{s_2}{D_p})$.

There are 1 figure and 3 Soviet references.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors of the AS USSR, Leningrad)

SUBMITTED: February 3, 1960

Card 3/3

S/181/60/002/011/007/042
B006/B056

24.7700 (1035, 1043, 1143)

AUTHORS: Subashiyev, V. K., Landsman, A. P., and Kukharskiy, A. A.

TITLE: Distribution of Phosphorus Atoms During the Diffusion in Silicon

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 11, pp. 2703 - 2709

TEXT: The authors describe investigations they carried out to determine the depth distribution of the concentration of phosphorus impurities in silicon by removing thin ($\sim\mu$) layers by etching (with a KOH solution) or grinding. Nine specimens were used for the purpose. In six cases, a comparison of experimental with theoretical results was found to be impossible, and in three cases the experimental results were so inaccurate that no unambiguous conclusions could be drawn from them. Extrapolation of the experimental data to zero thickness showed that n_o is always equal to $5 \cdot 10^{20}$ cm^{-3}. This value coincides with the solubility limit of phosphorus in silicon at 1250-1300°C (where diffusion took place). The three most characteristic cases of the depth distribution of concentration (as shown in Figs. 2-4) are investigated. From a theoretical point of view,

an anomalous course of the depth distribution curves is found, i.e., they are not linear and at greater depths the concentration decreases more rapidly than linearly. The curves fit well into the obtuse angle of two intersecting straight lines. The attempt is made to explain this anomaly by the following assumptions: 1) The original specimen was inhomogeneous. 2) There exists a reactive diffusion, i.e., the diffusion is accompanied by a reaction between P and Si, and a P-Si compound is formed. 3) The diffusion coefficient depends on the concentration of the diffusing phosphorus. This assumption is the least probable. The first two assumptions are briefly discussed. Summing up: 1) The distribution of the phosphorus concentration as a result of its diffusion in p-type silicon sheets was studied. 2) It was found that the concentration values calculated from data on the electrical conductivity and from the curve $n\mu = f(n)$ agree fairly well with the values resulting from measurements of electrical conductivity and Hall effect. This indicates that the concentration of compensated impurities is small compared to that of uncompensated impurities. 3) The carrier concentration distribution according to the depth does not follow the second Fick law. Indeed, the p-n junction, which is formed in the diffusion of phosphorus in p-type Si is only half

L 12825-63 EWT(l)/EWG(k)/BDS/EEC(b)-2 AFFTC/ASD/ESD-3 Pz-4 AT/IJP(C)

ACCESSION NR: AT3003021 S/2927/62/000/000/0282/0290

64

AUTHOR: Subashiyev, V. K.; Ravich, Yu. I.

TITLE: Photovoltaic effect of a p-n junction with an arbitrary generation function and an inhomogeneous front wall [Report at the All-Union Conference on Semiconductor Devices, Tashkent, 2-7 October 1961]

SOURCE: Elektronno-dy*rochny*ye perekhody* v poluprovodnikakh. Tashkent, Izd-vo AN UzSSR, 1962, 282-290

TOPIC TAGS: photovoltaic effect, p-n junction theory

ABSTRACT: The existing photovoltaic cell theories hold that:(a) the field in the near-junction region is zero; (b) mobility and lifetime are constant; (c) light is monochromatic. However, in practice photovoltaic cells (a) are manufactured by diffusion methods entailing nonhomogeneity of the front wall and (b) are used with a heterochromatic light. The article tries to fill if partially the above gap in the theory. In the p-n junction, the p-region is assumed to be very extensive so that the problem can be considered as single-dimensional. The p-n junction is assumed to be narrow as compared to the free-path length and the diffusion length.

Card 1/2

L 12825-63
ACCESSION NR: AT3003021

A steady-state case and a moderate heterochromatic illumination are considered. Differential equations that describe p-current density and p-concentration distribution in the n-region are considered and solved for a simplified case. Similar solutions are obtained for the p-region. A formula for the total current is developed which shows that the current consists of two components, one depending on the voltage across the p-n junction and another, on the illumination. A "drift photovoltaic cell" is considered; it has a strong field in the front wall which caused the carriers drift from their generation place to the junction. Finally, a p-n junction with a uniform field in the adjacent regions is considered. Orig. art. has: 1 figure and 33 formulas.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 15May63 ENCL: 00

SUB CODE: PH NO REF SOV: 005 OTHER: 002

Card 2/2

22412

9,6000 (also 2605; also 1040, 1067, 1089)

S/120/61/000/002/023/042
E073/E535

AUTHORS: Subashiyev, V. K. and Druzyak, N. P.

TITLE: Milliwattmeter with Hall Sensors

PERIODICAL: Pribory i tekhnika eksperimenta, 1961, No.2, p.125

TEXT: A milliwattmeter is described which is designed for measuring the power developed by a photocell. The instrument consists of an electromagnet Э (Steel-3, 100 x 70 x 30 mm, 2500 turns, 11 Ohm) producing a 1000 Oe field with a 10 mA current in a 0.5 mm gap; a Hall sensor Д (n-type germanium of 20 Ohm cm resistivity); a galvanometer W with a scale of 0 to 80 mW, 1.6×10^{-7} A/mm sensitivity, a 100 Ohm resistance; a milliammeter A; a millivoltmeter V and a 1.5 V battery Б. An n-type germanium Hall sensor is glued into the gap. Its resistivity (ρ = 20 Ohm cm) is large enough to ensure the high resistance of the sensor (2 kOhm) that is necessary for reducing the shunting effect of the parallel connected photo-c e l l. The voltage transformation coefficient of the sensor is 2% at H = 1 kOe. The battery, which is connected into the circuit by the switch K, enables loading the photocell with a load varying between $R_1+R_2+R_3$ (switch K open) and zero (with K closed

Card 1/4

Milliwattmeter with Hall Sensors

S/120/61/000/002/023/042
E073/E535

and the battery connected with the correct polarity). R_1 and R_2 are potentiometers and a resistance R_3 is provided for balancing out the nonequivalence of the Hall electrodes. Since the magnetic field of the electromagnet is proportional to the current of the photocell and the voltage of the photocell is applied to the current leads of the Hall pick-up, the galvanometer readings will be proportional to the product of the current and voltage supplied by the photocell. Before beginning the measurements, the non-equivalence of the Hall electrodes has to be compensated by means of the resistance R_3, i.e. the galvanometer has to be set to zero. The compensation is effected with the photocell illuminated and the magnetic circuit open. Following that, the current circuit is closed, the battery switched on and the circuit is ready for making the measurements. By operating the resistance R_1 and R_2, the maximum power generated by the photocells can be determined. Thereby, the milliammeter and the millivoltmeter determine the current and voltage values at the optimum point of the characteristic. The battery is switched into the circuit in such a way that it should produce a current in the winding R_3 in the same

Milliwattmeter with Hall Sensors S/120/61/000/002/023/042
E073/E535

direction as the photocell; the potentiometers R_1 and R_2 are then adjusted to obtain a zero voltage on the photocell. In this case the current recorded by the milliammeter will be equal to the short-circuit current of the photocell. For determining the no-load voltage, it is sufficient to break the R_2 circuit and to break the connection between the terminal of the voltmeter V and the sensor Δ. The calibration curve of the instrument for the entire range of 0 to 80 mW is a straight line. There is 1 figure.

ASSOCIATION: Institut poluprovodnikov AN SSSR
(Semiconductor Institute AS USSR)

SUBMITTED: April 19, 1960

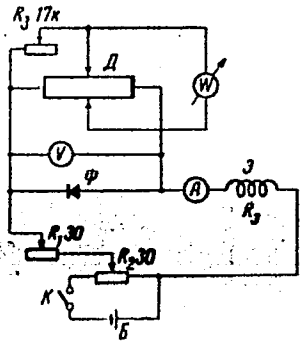
Card 3/4

21412

Milliwattmeter with Hall Sensors

S/120/61/000/002/023/042
E073/E535

Figure



Card 4/4

23118
S/181/61/003/005/023/042
B136/B201

9.4300 (1143, 1150, 1151)

AUTHORS: Petrusevich, V. A., Subashiyev, V. K., and Morozov, G. P.

TITLE: Study of germanium by photoelectric methods

PERIODICAL: Fizika tverdogo tela, v. 3, no. 5, 1961, 1505-1514

TEXT: The authors have suggested in earlier papers that the diffusion length L, the surface-recombination constant, the absorption coefficient k, and other quantities be determined from the spectral distribution curve of photoconductivity (SPH). From the formula derived here for the ratio of photoconductivity $\Delta\sigma$ (λ) to photoconductivity $\Delta\sigma$ (λ_0) at the shortwave limit it follows that this ratio is a linear function of k, which cuts off the section $b = -1/L$ on the abscissa, and the section $\gamma = (D/s)(1/L)$ on the ordinate. D is here the coefficient of ambipolar diffusion. s can be determined therefrom. Also the absorption coefficient can be determined analytically or graphically. The measuring arrangement has already been described in Ref.4 (V. A. Petrusevich, Sb. FTT, I, 56, 1959). SPH and, for comparison, the photomagnetic effect (PHME) were measured for each specimen and each kind of surface treatment. The effect of the reflection factor R

Card 1/5

Study of germanium ...

which normally depends upon the wavelength, is eliminated by the choice of certain etching methods. The values for s obtained by the PHME method are found to be particularly low in cases where the specimens are pickled after grinding or polished with a pad after etching. The diffusion length L display a very good reproducibility even with different surface treatments. Aside from few cases, the continuous $k(\lambda)$ curve obtained by the usual method is in excellent agreement with the values calculated point by point with the use of the formula

$$k=\frac{1}{a}\frac{1}{\frac{\Delta\sigma(\lambda)}{A}-1}=\frac{s}{L}\frac{1}{\frac{\Delta\sigma(\lambda)}{\Delta\sigma(\infty)}-1}. \qquad (8)$$

The cause of the deviations is probably to be found in the existence of a potential barrier on the surface, and explains why this method is doubtful. A comparison between the methods of measuring the recombination constant s shows that the PHME method has certain disadvantages in that it calls for particularly thin specimens, and, in addition, D andL must be exactly known. Although the formula for s, upon which the PHME method is

Card2/5

Study of germanium ...

based, may be simplified, it is only applicable with small s and a specimen thickness of only few μ. The coefficient of ambipolar diffusion may be also obtained by the combination of two formulas indicated here and by the measurement of both PHME and SPH. The agreement between experimental and theoretical curves also corroborates the assumption that τ_n must be equal to τ_p. [Abstractor's note: not explained.] A comparative experiment was performed to check the new method. The agreement of experimental data depends on whether the surface properties play a part or not; their effect upon the measured quantities is explained in detail. Finally, the values found here by different methods and exhibbiting good agreement prove that the concept of the diminution of photosensitivity in the case of short wavelengths may be explained by the effect of surface recombination of the carriers. There are 6 figures, 2 tables, and 10 references: 3 Soviet-bloc and 7 non-Soviet-bloc. The two most recent references to English-language publications read as follows: R. M. Zitter, A. J. Strass, A. E. Attard, Phys. Rev. 115, 266, 1959; R. Braunstein, A. R. Moore, F. Herman, Phys. Rev., 109, 695, 1958;

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad
(Institute of Semiconductors, AS USSR Leningrad)

Card 3/5

Study of germanium ...

SUBMITTED: November 9, 1960

Fig.3. Graph $\Delta\sigma = f(\frac{1}{\kappa})$ for two surface treatments. Curves indicated as: 1) glass etched by [illegible] (SR-4) 2) glass etched by H_2O_2. Abscissa - $\frac{1}{\kappa}$, cm ordinate - $\Delta\sigma$ in relative units.

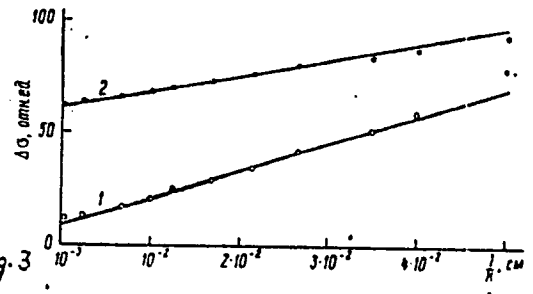


Fig. 3

Card 4/5

23118
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B136/B201

Study of germanium ...

Fig.6. Ambipolar diffusion coefficient of W_o which, in turn, is a function of resistivity. Legend: 1) p-type; 2) n-type. Ordinate - D, cm^2/sec.

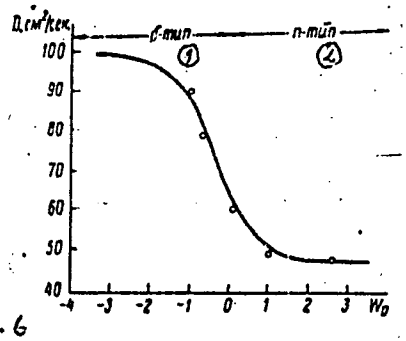

Fig. 6

Card 5/5

32068
S/181/61/003/012/002/028
B102/B108

9,4160 (1137, 1134, 1147)

AUTHOR: Subashiyev, V. K.

TITLE: Valve-type photoeffect at a p-n junction for an arbitrary generation function

PERIODICAL: Fizika tverdogo tela, v. 3, no. 12, 1961, 3571 - 3580

TEXT: The volt-ampere characteristics of a valve photocell is calculated for an arbitrary generation function. A homogeneous field is assumed to exist in the vicinity of the p-n junction. Such a field can be caused by a current flowing through these regions, and an even gradient of the impurity concentration. The p-n junction considered is shown in Fig. 1. The x-axis is perpendicular to the junction plane. The hole distribution in the n-region and the electron distribution in the p-region are calculated:

Card 1/6

Valve-type photoeffect at a ...

$$(23)\qquad \left.\begin{aligned} j_p &= \frac{qp_{n1}}{L_p} D_p \left(\frac{\delta_l'}{\delta_l}\sqrt{\mathcal{E}^2+1}+\mathcal{E}\right)\left(e^{\frac{qV}{kT}}-1\right)- \\ &\quad -qL_p\int_0^{\xi_l} e^{\mathcal{E}(\xi-\xi_l)}\frac{\delta(\xi_1)}{\delta_l}\,g(\xi)\,d\xi, \\ &\quad \xi_1=\sqrt{\mathcal{E}^2+1}\,\xi. \end{aligned}\right\}$$

and

$$(36)\qquad j_n = q\frac{D_n}{L_n}\frac{n_{p1}}{\sqrt{\mathcal{E}^2+1}-\mathcal{E}}\left(e^{\frac{qV}{kT}}-1\right)-qL_n e^{\gamma_1\zeta_l}\int_{\zeta_l}^{\infty} e^{-\gamma_1\zeta}\,g(\zeta)\,d\zeta.$$

The total current density for the equilibrium fields $\mathcal{E}_n$ and $\mathcal{E}_p$ in the n and p-regions is:

$$j = q\left[\frac{p_{n1}D_p}{L_n}\left(\frac{\delta_l'}{\delta_l}\sqrt{\mathcal{E}_n^2+1}+\mathcal{E}_n\right)+\frac{n_{p1}D_n}{L_n}\left(\sqrt{\mathcal{E}_p^2+1}+\mathcal{E}_p\right)\right]\left(e^{\frac{qV}{kT}}-1\right)- \qquad (37)$$

$$-q\left[L_p\int_0^{\xi_l} e^{\mathcal{E}_n(\xi-\xi_l)}\frac{\delta(\xi_1)}{\delta_l}\,g(\xi)\,d\xi+L_n\int_{\zeta_l}^{\infty} e^{\gamma_1(\zeta_l-\zeta)}\,g(\zeta)\,d\zeta\right];$$

Card 2/6

Valve-type photoeffect at a ...

(41) $$\lim_{\delta_n \to -\infty} j_{pL} = qL_p \int_0^{\xi_l} g(\xi)\, d\xi = q \int_0^{l} g(x)\, dx$$

(42) $$\lim_{\delta_p \to -\infty} j_{nL} = qL_n \int_{\zeta_l}^{\infty} g(\zeta)\, d\zeta = q \int_{l}^{\infty} g(x)\, dx,$$

For an arbitrary generation function, the hole and electron components of the photocurrent can be calculated with the relations

(45) $$j_{pL} = qL_p \int_0^{\xi_1} a_p(\xi) g(\xi)\, d\xi,$$

(46) $$j_{nL} = qL_n \int_{\zeta_1}^{\infty} a_n(\zeta) g(\zeta)\, d\zeta,$$

and the pair separation coefficients

(43) $$\alpha_p(\xi) = e^{\delta_n(\xi - \xi_l)} \frac{\delta(\xi_1)}{\delta_l},$$

(44) $$\alpha_n(\zeta) = e^{\gamma_l(\zeta_l - \zeta)}$$

Card 4/6

Valve-type photoeffect at a ...

For monochromatic light $g(\xi) = \beta H_s k e^{-kLp\xi}$, and the photocurrent density is given by

$$j_L = q\beta H_s \left\{ \frac{kL_p}{k^2L_p^2 - 2\mathcal{E}_n kL_p - 1} \left[e^{-kl}\left(\mathcal{E}_n - kL_p - \sqrt{\mathcal{E}_n^2+1}\,\frac{\delta_l'}{\delta_l} \right) + \right.\right. \tag{48}$$
$$\left.\left. + \frac{e^{-\mathcal{E}_n \xi_l}}{\delta_l}(a_{ps} - 2\mathcal{E}_n + kL_p) \right] + \frac{kL_n}{kL_n + \delta_p + \sqrt{\delta_p^2+1}} e^{-kl} \right\}.$$

(β - quantum yield of inner photoeffect, H_s - number of quanta penetrating into the specimen, k - absorption coefficient; for electrons, the generation function $g(\xi)$ is analogous.). The author thanks Yu. I. Ravich for discussions. There are 7 figures and 7 references: 3 Soviet and 4 non-Soviet. The four references to English-language publications read as follows: R. Cummerow. Phys. Rev., 95, 16, 1954; E. Rittner. Photoconductivity conference Atlantic City, London, Chapman a. Hall, 215, 1956; M. Prince. J. Appl. Phys., 26, 534, 1955; D. A. Kleinman. Bell syst. Techn. Journ. XL, No. 1, 85, 1961.

Card 5/6

Valve-type photoeffect at a ...

S/181/61/003/012/002/028
B102/B108

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors AS USSR, Leningrad)

SUBMITTED: June 12, 1961

Card 6/6

SUBASHIYEV, V.K.; DRUZYAK, N.P.

Milliwattmeter with a Hall transmitter. Prib. i tekh. eksp. 6 no.2:125 Mr-Ap '61. (MIRA 14:9)

1. Institut poluprovodnikov AN SSSR.
(Wattmeter)

SUBASHIYEV, V. K.

43935
0/030/62/002/008/002/005
I046/I246

24.2600

AUTHORS: Subashiyev, V.K. and Ravich, Yu.I.

TITLE: Contribution to the theory of valve photoeffect on p-n junctions

PERIODICAL: physica status solidi, v. 2, no. 8, 1962, 1043-1061

TEXT: The current-voltage characteristics are calculated for an illuminated p-n junction, allowing for an arbitrary spectral composition of the incident light and non-uniform properties of the n- and p-regions. The current flowing across the junction is found to consist of a component which is independent of the light intensity and varies exponentially with the applied voltage, and of a component which is independent of the applied voltage and varies in proportion to the illumination intensity (the dark and the short-circuit currents, respectively). The two components are expressible in terms of a special position function which, being independent of voltage and illumination, is calculated for the following cases: 1. The parameters characterizing the diffusion, the recombination and the drift of minority carriers are constant throughout the p- and the n-regions. 2.The parameter values change as a step-function. 3. A strong electric field

Card 1/2

24.7100

L 6079

S/181/62/004/009/007/045
B108/B186

AUTHOR: Subashiyev, V. K.

TITLE: Effect of a layer with enhanced recombination on the light and dark characteristics of a p-n junction

PERIODICAL: Fizika tverdogo tela, v. 4, no. 9, 1962, 2359 - 2364

TEXT: It has been shown before (FTT, 3, 12, 3571, 1961) that the light and dark currents can be calculated in terms of the hole and electron accumulation functions α_p and α_n, respectively, when the function g(x) of pair production by light and the inhomogeneities of the region in question are known. α_p is deduced from the expression for the overall current in the n-type region of a p-n junction wherein the hole diffusion length L has either one or two discontinuities. The results show that an intermediate layer with an enhanced recombination considerably reduces the coefficient of accumulation. The layer can be regarded as an effective surface with the surface recombination rate D/L_2. There are 2 figures and 1 table.

Card 1/2

45345

S/181/63/005/002/027/051
B104/B102

24.7700

AUTHOR: Subashiyev, V. K.

TITLE: Parameter determination of semiconductors from the photomagnetic effect and the photoconductivity

PERIODICAL: Fizika tverdogo tela, v. 5, no. 2, 1963, 556-558

TEXT: In a paper by V. A. Petrusevich (FTT, 4, 461, 1962) the diffusion length and surface recombination rate were determined from the stationary photoconductivity and from the photomagnetic effect. Erroneous assumptions led to a wrong formula for the photomagnetic effect of thick specimens. Here this error is corrected and the resulting conclusions are drawn. Relation

$$\frac{1}{V}=\frac{\sigma}{IH}\,\frac{b\tau_p+\tau_n}{b+1}\,\frac{r}{L}\left[1+\frac{1}{k}\left(\frac{1}{L}+\frac{s}{D}\right)\right]. \qquad (3)$$

between the voltage V applied to a thick specimen and the parameters of the specimen is derived with sufficient accuracy. l is the specimen length, $b=\mu_n^*/\mu_p^*=\mu_n/\mu_p$, $r=\mu_p^*/\mu_p$, and $\mu_p^*,\mu_n^*,\mu_p,\mu_n$ are the Hall

Card 1/2 S/181/63/005/002/027/051

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1962

S/181/63/005/004/021/047
B102/B186

AUTHOR: Dubrovskiy, G. B., and Subashiyev, V. K.

TITLE: Effect of intense doping on the ultraviolet reflection spectrum of silicon

PERIODICAL: Fizika tverdogo tela, v. 5, no. 4, 1963, 1104 - 1106

TEXT: The UV reflection peaks at 4.3 and 3.4 ev of Si (J. Phys., Chem. Sol., 12, 208, 1960; 20, 190, 1961; Phys. Rev., 113, 4, 1002, 1959; 120, 1, 37, 1960) were investigated and the effects of doping with acceptor or donor impurities on these transitions was studied. The measurements were made by the usual method of comparing the intensity of incident and reflected light, for a reflection angle of about 5°. The monochromatic light source was an СФ-4 (SF-4) spectrophotometer lamp (H_2 or Xe); an ФЭУ-18А (FEU-18A) photomultiplier served as receiver. It was found that doping with B, P, or As in the concentration range 10^{17} - 10^{20} cm^{-3} did not affect the position of the reflection peaks. The Coulomb field of the impurity ions exerts only a very weak effect on the mutual position of valency and conduction bands. The results obtained indicate that the 3.4 ev peak will be due to

Card 1/2

Effect of intense doping...

$L_3' \rightarrow L_3$ transitions and not $\Gamma_{25}' \rightarrow \Gamma_{15}$, as assumed by Ehrenreich et al. (Phys. Rev. Lett., 8, 59, 1962). There are 3 figures.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors AS USSR, Leningrad)

SUBMITTED: November 13, 1962

SUBASHIYEV, V.K.; DYMSHITS, Yu.I.

Flow circulation in a closed iodide cycle. Zhur. prikl. khim. 36 no.12:2751-2754 D'63. (MIRA 17:2)

ACCESSION NR: [illegible] EWT(l)/EWT(m)/T/EWP(t)/EWP(b)/EWA(h)/EWA(c) Pz-6/Peb

AUTHOR: Subashiyev, V. K.; Dymshits, Yu. I.

TITLE: Study of gas streams in closed iodide circuit

SOURCE: Zhurnal prikl khimii, v. 36, no. 12, 1963, 2751-2754

TOPIC TAGS: germanium semiconductor, germanium single crystal, single

ABSTRACT: A method for preparing monocrystal germanium films from germanium [illegible] was [illegible] described previously (IBM J. Res. Develop. 4, 3, (1960)) was used. This method was employed to analyze the physico-chemical processes [illegible] take place in an ampoule during the growth of germanium layers. It was

L 39958-65
ACCESSION NR: AP4004935

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[illegible] to the temperature fall zone which favor the disproportionation [illegible]

[illegible] The growth [illegible]

[illegible]

[illegible] of the germanium dioxide takes place in proportion to its travel, [illegible]

[illegible]

The concentration of the current carriers has a value within the limits [illegible] figures

ASSOCIATION: None

SUBMITTED: 29Dec61

SUB CODE: SS, ME NO REF SOV: 000 OTHER: 001

Card 2/2

SUBASHIYEV, V. K.; ABAGYAN, S. A.

"Band structure in $GaAs_x$, P_{1x} crystals."

report submitted for Intl Conf on Physics of Semiconductors, Paris, 19-24 Jul 64.

ACCESSION NR: AP4013515 S/0181/64/006/002/0512/0514

AUTHORS: Subashiyev, V. K.; Dubrovskiy, G. B.

TITLE: Quantum yield of the internal photoelectric effect in highly doped semiconductors

SOURCE: Fizika tverdogo tela, v. 6, no. 2, 1964, 512-514

TOPIC TAGS: quantum yield, photoelectric effect, photoactive absorption, nonphotoactive absorption, current carrier absorption

ABSTRACT: In some frequency range immediately next the edge of the principal absorption band, a continuous change in quantum yield is observed, from 0 to 1. This range narrows as temperature declines. If electrons are excited from the valence band to the conduction band by a single mechanism of light absorption, then at absolute zero the energy dependence of the quantum yield should exhibit a clear "step" at $h\nu = E_g$. It is shown that when nonphotoactive absorption is present, the quantum yield is expressed by the coefficients of absorption in the following form: $\beta = \frac{a_p}{a_p + a_n}$, where a_p and a_n are the coefficients of photo-

Card 1/2

ACCESSION NR: AP4013515

active and nonphotoactive absorption, respectively. It has been found that through a wide spectral range the coefficient of nonphotoactive absorption may be equal to or even considerably larger than that of photoactive absorption, and this, of course, leads to a decrease in quantum yield. In highly doped materials, the principal mechanism of nonphotoactive absorption is absorption by free current carriers. "The authors express their sincere thanks to N. S. Zhdanovich for his great aid in treating the experimental data and in making computations." Orig. art. has: 4 figures and 6 formulas.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors AN SSSR)

SUBMITTED: 30Aug63 DATE ACQ: 03Mar64 ENCL: 00

SUB CODE: GP,EC NO REF SOV: 003 OTHER: 005

Card 2/2

ACCESSION NR: AP4028433 S/0181/64/006/004/1078/1081

AUTHORS: Subashiyev, V. K.; Dubrovskiy, G. B.; Kukharskiy, A. A.

TITLE: Determining the optical constants and concentrations of free current carriers in strongly doped semiconducting materials by the reflection coefficient

SOURCE: Fizika tverdogo tela, v. 6, no. 4, 1964, 1078-1081

TOPIC TAGS: optical constant, current carrier, doped semiconductor, reflection coefficient

ABSTRACT: The authors describe a method of determining the indices of refraction, absorption, and concentration of free current carriers in semiconducting materials by the spectral behavior of the reflection coefficient of nonpolarized light at normal incidence. Beginning with the ordinary relations of reflection, refraction, and absorption for normal incidence, the authors express the effective part of the dielectric constant by refractive index and absorption coefficient. It follows the the difference in dielectric constant (for pure and doped semiconductor) depends linearly on the square of the wavelength. A graph may be drawn of this dependence for standard samples with various carrier concentrations. The slope of this curve

Card 1/3

ACCESSION NR: AP4028433

is determined and extrapolated through a wide range of frequencies, thus extrapolating the values of dielectric constant. This permits determination of refractive index and absorption coefficient. Experimental tests were made on Si, and the indices of refraction and absorption were found to exhibit spectral dependence in the infrared region on the edge of intrinsic absorption. The authors conclude that the method proposed is especially effective for small, highly doped samples and also for rods with epitaxial films and p-n structures. A drop in refractive index is observed with decrease in wave length, and this is due to excitation of plasma vibrations in the electron gas. The natural frequencies of these vibrations are proportional to the square root of the carrier concentration. Thus, by determining the frequency from the behavior of the reflection coefficient (according to wavelength), the carrier concentration can be determined. Orig. art has: 4 figures and 9 formulas.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors AN SSSR)

SUBMITTED: 16Oct63 DATE ACQ: 27Apr64 ENCL: 00

Card 2/3

ACCESSION NR: AP4034905 S/0181/64/006/005/1303/1310

AUTHORS: Subashiyev, V. K.; Dubrovskiy, G. B.

TITLE: Indirect transitions and structure of the valence band of silicon

SOURCE: Fizika tverdogo tela, v. 6, no. 5, 1964, 1303-1310

TOPIC TAGS: valence band, silicon, SF 4 spectrophotometer, fundamental absorption, parabolic band

ABSTRACT: The authors have measured the absorption near the edge of the fundamental absorption band in homogeneous single crystals of silicon obtained from melts with concentrations of B and P ranging from 10^{18} to $2.2 \cdot 10^{19}$ cm^{-3}. The spectral dependence of the absorption coefficient was measured for both n-type and p-type Si. It was found that the frequency dependence of free carriers in p-type Si follows the law $\alpha \sim \nu^{-2}$, as is true of most semiconductors. All investigated samples of n-type Si, in the range from 0.8 ev to the edge of fundamental absorption, exhibited a dependence of $\alpha \sim \nu^{-m}$, where $m = 3.45 \pm 0.02$. On the basis of a parabolic band, a deviation was found between the frequency dependence of fundamental absorption and the calculated absorption. If a variable effective mass is accepted for the

Card 1/2

ACCESSION NR: AP4041692 S/0181/64/006/007/1956/1961

AUTHOR: Subashiyev, V. K.

TITLE: Determination of the quantum yield of the internal photoeffect from the spectral dependence of the photoconductivity and from the photomagnetic effect

SOURCE: Fizika tverdogo tela, v. 6, no. 7, 1964, 1956-1961

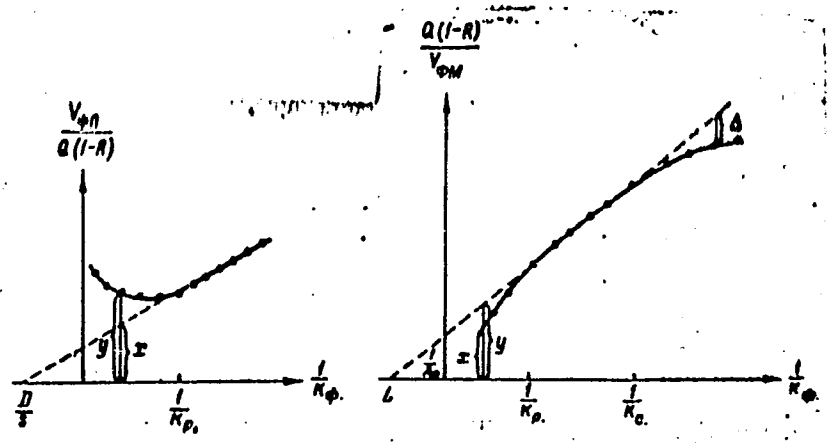
TOPIC TAGS: photoeffect, photoconductivity, photomagnetic effect, quantum yield, internal photoeffect, spectral analysis

ABSTRACT: It is indicated that the quantum yield β of the internal photoeffect has been evaluated for only a few substances and for a narrow range of quantum energy, owing to the lack of well developed procedures for the determination of the quantum yield. The method proposed in the present work is claimed to be more general, since it permits β to be determined in the region of weak absorption ($\beta < 1$),

Card 1/4

ACCESSION NR: AP4041692

ENCLOSURE: 01



Left - determination of $\beta = x/y$ from photoconductivity
Right - determination of β from the photomagnetic effect

Card | 3/4

AP4044964 S/0181/64/006/009/2852/2853

AUTHOR: Abagyan, S. A.; Lishina, A. V.; Subashiyev, V. K.

TITLE: Minima of conduction bands of crystals of the GaAs-GaP system

SOURCE: Fizika tverdogo tela, v. 6, no. 9, 1964, 2852-2853

TOPIC TAGS: gallium arsenide phosphide, conduction band, crystal lattice parameter, crystal composition, absorption band

ABSTRACT: To reconcile some discrepancies in the published data, the authors investigated the minima of the conduction band, using [illegible] grown from the gaseous phase. The crystal composition was [illegible] x-ray measurements of the lattice parameter directly [illegible] parameter to be [illegible] linear function of the composition. [illegible] procedures used to control the crystal quality, the change in the absorption, and to de-

L 14045-65
ACCESSION NR: AP4044964

termine the energy position of the minimum are the same as described by two of the authors earlier (S. A. Abagyan, V. K. Subashiyev, DAN SSSR, v. 156, 763, 1964). The results, based on the investiga- [illegible] of the intrirsic absorption edge of the crystals, show that [illegible] mum of the conduction band in InAs as well as the minima [illegible] crystals of composition $GaAs_xP_{1-x}$ differ from the published values. The data have also shown the presence of a minimum at 1.48 ev corresponding to indirect transitions which is assumed to be at the points (111) and which is capable of explaining the slight [illegible] effective mass near the (000) minimum. It is also [illegible] mixed composition, [illegible] another should [illegible] errors from the [illegible] This may result [illegible] with changes in [illegible] help with the [illegible] data." Orig. [illegible]

ASSOCIATION: [illegible]

Card 2/4